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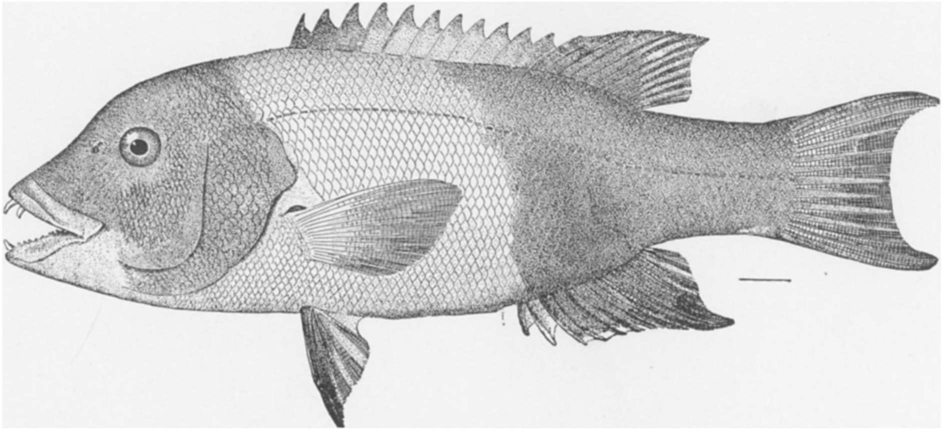
ZOOLOGY.

Protozoa.—A number of articles appear every month on the subject of the malaria parasites, treating of their morphology, system and pathogenity. Without going into details of all the original publications, the following may be taken as the most prominent views in regard to the parasites. Laveran, the original discoverer of the parasite which causes malaria, holds fast to the idea that only a single species of Protozoa is concerned in the disease and that the various forms, amoeba, crescent, etc., are only different stages in the development of this parasite (Du Paludisme et de son Hématozoaire, Paris, 280 p. 6 Plates, 1891). Grassi and Feletti on the other hand admit two genera: *Halmamoeba* and *Laverania*, the former with three species: *H. præcox*, producing quotidian fever, *H. vivax*, producing simple or double tertiana and *H. malaria* producing simple, double or triple quartana; Lavarania (the crescent) produces an irregular fever, (Centralblatt f. Bakt. u. Parasitenkunde IX, p. 430, 1891). *Halmamoeba* is supposed to correspond to *Amoeba guttata* and *Laverania* to *A. radiata.* Thus the malaria parasites are classified as Rhizopods by these authors. Metschnikoff, L. Pfeiffer and others class them as *Coccidia*, while Kruse argues that they must belong to the Gregarina, because an adult form is found free in the blood. In comparative Hæmo-parasitology Celli and Sanfelici (Ueber die Parasiten des rothen Blutkörperchen im Menschen und in Thieren, Fortschritte der Medicin Bd. 9, 1891) draw the conclusion that the endoglobular parasitism is more obligatory—and hence more highly developed in the Hæmogregarina of birds than in the blood parasites of cold blooded animals, since in the latter, the parasites thrive in the serum about as well as in the blood corpuscle. According to these authors, the blood parasites of the frog, on arriving at a certain stage, either undergo sporulation, or develop into *Drepanidium* of Ray Lankester.

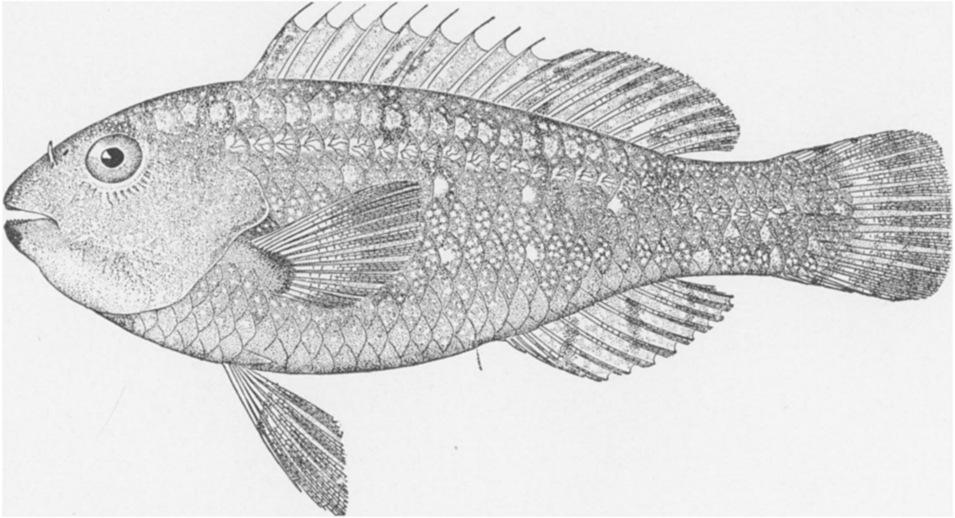
R. Pfeiffer (L. Pfeiffer, Ueber die Pathogene Protozoen) has recently made a very important discovery in regard to the development of *Coccidium.* According to these authors, gymnospores can be developed in the growing Coccidium and serve to spread the infection to other cells. Kruse has come to the same conclusion, but independently from Pfeiffer. Kruse states the gymnospores can be formed at any time during the development of the parasite. These naked spores evidently cannot spread the infection to other animals, this work being left to the other spores (Dauersporen) which are already well-known.

PLATE IV.



Trochocopus pulcher Ayres.

PLATE V.



Scarus hoplomystax Cope

Several authors claim to have found Microsporidia in Vertebrates; not denying their statements as a whole, the reviewer will simply state, that the portion of turtle's flesh given him for comparison, and supposed to be part of Danilewsky's original material, contained no Microsporidia, but was full of minute air bubbles between the muscle-fibres. It seems hardly possible, however, that Danilewsky and L. Pfeiffer could have mistaken these air bubbles for parasites, yet neither Railliet, Balbiani or the reviewer could find any Microsporidia. The material came from L. Pfeiffer.—C. W. Stiles.

Trematodes.—Hassall (American Veterinary Review, July 1891) describes the large liver-fluke found in American cattle as *Fasciola carnosa;* as this name is preoccupied he changes the name (Am. Vet. Rew. Sept.) to *F. americana.* [As yet it is impossible to say much in regard to this species. The animal is *undoubtedly* specifically different from *D. hepaticum,* but as I have stated in my Animal Report for 1891, bears very great resemblance to Bassi's *Distomum magnum.* Dr. Hassall and I are at present at work upon this species and hope soon to publish a full account of its anatomy and development.—C. W. S.]

Cestodes.—Dr. V. A. Moore recently presented a case of Echinococcus hydatid in a pig, before the Biological Society of Washington, D. C., and in the discussion which followed, Stiles spoke of two more unpublished cases in animals and one in man. Van Cott, of Brooklyn, has recently given a full account of this last case. It is high time, that the Health authorities in the various cities insist upon burning every organ infected with this hydatid, found in the slaughter-houses, and that more care is used in importing dogs (the final host of this tape worm,) from infected regions, if we wish to avoid an experience such as Australia has had for the past quarter of a century.

Prof. Linton has recently published several valuable papers on the parasites of fish (Notes on the Entozoa of Marine Fishes of New England, I and II; a contribution to the Life History of Dibothrium cordiceps; on two species of larval Dibothria from the Yellowstone Park; all published by the U. S. Fish Commission and free to scientists). These papers will be found to be very valuable in determining the parasites of fish, as the descriptions are very complete. In reading the diagnoses, however, one should remember that Linton unintentionally misused the word "lateral." In places where that word occurs, "dorsal" or "ventral" should be inserted. That Linton simply wrote lateral, by mistake, is proven by the fact that he speaks of the *breadth* as the "*lateral diameter.*" It is impossible to mention here all of the curious and interesting species Linton has described; in several species of Dibothrium, for instance, the uterus empties *dorsally*, a point about which one would be inclined to be very sceptical, were it not that Linton gives drawings of the animals and exact measurements of the apertures. In one of his papers Prof. Linton determines the white pelican (*Pelecanus erythrorhynchus*) as the final host of *Dibothrium cordiceps* Leidy, the larval stage of which is found in the trout (*Salmo mykiss*) of the Yellowstone Park. The reviewer must differ from Prof. Linton in the interpretation of cysts in which these larvæ are found Linton interpreted them as *blastocysts*, but the histology described by the author gives more the impression that they are connective tissue and since the Reviewer has examined some specimens kindly sent to him by Prof. Linton to determine this question, he does not hesitate to state that we have connective tissue cysts of the host before us, instead of blastocysts. This point is very important, for were it a *blastocyst* as Prof. Linton thought, this species would form an exception in the family Bothriocephalidæ, for the blastocyst would of course be homologous to the cysticercus of Tæniidæ and the head would form in much the same manner. As it is, *not* the cyst, but the enclosed larva, is the homologon of the cysticercus.

The family Taeniidae has been undergoing considerable revision at the hands of the noted French zoologist, R. Blanchard. In a work (112 pp.) entitled Histoire zoologique et medicale des Teniides du genre Hymenolepis, Paris, 1891, Blanchard separates all these tape worms from the genus Tænia, which have three testes in each segment, with genital pores on the left border (for further particulars of the diagnosis, see the original). *Hymenolepis nana* and *H. diminuta* are of particular interest since they occur in man, and *H. murina* (according to Grassi identical with *H. nana*), since Grassi has shown that in this form we have a remarkable exception to the rule of development of the Tæniidae, in that *H. murina* develops *indirectly* but *without change of host.* The following is a synopsis of the species admitted by Blanchard to the genus Hymenolepis. (See Table on pages 67 and 68.)

In his notices Helminthologiques (Mem. de la Soc. Zool. de France, 1891, p. 420-480) Blanchard separates those members of the genus Taenia which have armed suckers into three new genera. 1, *Echinocotyle* R. Bl., '91. Rostellum with 10 large hooks, each sucker with a circle of spines on the edge and a longitudinal row in the middle, etc. 2, *Davainea* R. Bl. and Railliet '91, Rostellum or infundibulum with double row of hooks, each sucker surrounded with several circular rows of hooks. Corpuscles made up of conglomerations of eggs are

ADULT STAGE.	HOST.	LARVA.	SECONDARY HOST.
1. H. murina Dujardin, 1845.	Mus decumanus M. pumilus M. musculus Myoxus quercinus	Cercocystis(Grassi)	Same as primary host, villosities of the intestine.
2. H. nana von Siebold, 1853. Syn. Taenia nana v. Sieb. (nec. P. J. v. Beneden, 1861.) T. aegyptiaca Bilharz., 1852. Diplacanthus nanus Weinland, 1858. T. (Hymenolepis) nana R. Leuckart, 1863.	Homo	?	?
3. H. microstoma Dujardin, 1845.	Mus musculus M. rattus	C. tenebrionis Villot	Tenebrio molitor
4. H. furcata Stieda 1862.	Crocidura aranea	?	?
5. H. uncinata Stieda 1862.	Cr. leucodon Cr. aranea	Cercystis(Bl.)Urocystis (v. Linstow.)	Silpha laevigata Glomeris limbatus
6. H. scalaris Duj., 1845.	Cr. aranea	Staphylocystis biliaris, Villot	Glomeris limbatus
7. H. pistillum Duj., 1845.	Cr. aranea	St. micracanthus Villot	
8. H. tiara Duj., 1845.	Cr. aranea	?	?
9. H. erinacei Gmelin, 1789. Syn. Halysis erinacei Zeder, 1803. Taenia tripunctata Braun, 1810. T. compacta Rudolphi, 1810.		?	?
10. H. bacillaris Goeze, 1782. Taenia bacillaris Diesing, 1851, proparte.	Talpa europaea	?	?
11. H. acuta Rud, 1819. Syn. T. obtusata P. v. Ben. 1872. nec. Rud. 1819.	Vesperugo serotina V. noctula	?	?
12. H. decipiens Dies., 1850.	Chilonycteris rubiginosa Molossus perotis	?	?

B Unarmed Hymenolepis, *i. e.* Adult without hooks.

13. H. relicta Zschokke, 1888.	Mus decumanus	Cercocystis	Asopia farinalis
14. H. diminuta Rnd., 1819.	M. decumanus		Anisolabis annulipes
Syn. Taenia diminuta Rud., 1819.	M. rattus		Axis spinosa
T. leptocephala Creplin, 1825.	M. musculus		Scaurus striatus
T. flavopunctata Weinland, 1858.	M. alexandrinus		
T. varesina Erm Parona, 1884.	Homo		
T. minima Grassi, 1886.			

scattered through the parenchym. Most of the species of this group are parasites of birds, *D.* (*Taenia*) *madagascariensis* however is parasitic in man. 3, *Ophryocotyle* Friis, 1869. Rostrum absent, infundibulum present, its border armed with several rows of small hooks. Several transverse rows of hooks on the suckers.

The subfamile Anoplocephalinae R. Bl., '91, contains the unarmed Taeniæ found in herbivorous animals, segments wider than long, egg with pyriform apparatus, 3 genera. 1, *Bertia,* R. Bl., '91, genital pores irregularly alternate, etc., 2 species, found in primate anthropoides, (Mem. cit. p. 186-196). 2, *Moniezia,* R. Bl., '91, two genital pores to each segment, etc., (Bul. cit. p. 444) contains 11 species many of which are important to economic zoology: *M.* (*Taenia*) *expansa* and *M.* (*T.*) *denticulata* of sheep and cattle, etc. 3, *Anoplocephala* Em. Bl., 1868, sexual pores unilateral, etc., contains 2 species: *A.* (*Taenia*) *mamillana* and *A.* (*T.*) *perfoliata* of the horse, etc.

In the same publication R. Blanchard treats more minutely several species of the genus *Moniezia* found in rodents and gives some shorter observations on various Distomes.—C. W. Stiles.

Nematodes.—Willach (Arch. f. w. u. pr. Thierheilkunde, 1891, p. 340-346) describes a new and dangerous parasite, found in nodules of the colon of *Macacus cynomolgus.* This helminth, which receives the name of *Sclerostoma apiostomum,* proved fatal in two out of three cases examined. Stiles (Sur la Dent des Embryons d'Ascaris; Bull. d. l. Soc. Zool. d. France, 1891, p. 162) claims that the so-called "boring tooth" found in embryos of *Ascaris lumbricoides* is composed of three parts, each of which corresponds to a lip of the adult Ascaris.—C. W. S.

Notice of Trematode Parasites in the Crayfish.—Prof. Charles A. Davis, of Alma, Michigan, has submitted to me for identification several cysts from the common crayfish, which prove upon examination to contain immature trematodes. They belong to the genus Distomum and are evidently specifically identical with the specimen described and figured by R. Ramsay Wright in volume XVIII of the AMERICAN NATURALIST, pp. 429—430. Prof. Wright's description is based on a single specimen which he obtained from a cyst in the ovary of a crayfish. He referred it to the species *Distomum nodulosum* Zeder. This species has been found in the cercaria stage in *Paludina impura* by Von Linstow. In the adult stage it is found free in the intestinal canal of several European fresh-water fish (Perca, Esox, Etc.,) and encysted on the outer surface of the intestine of one (*Acerina.*)

The specimens for the most part appear to be a little younger than Prof. Wright's specimens, but the larger ones agree with it in every essential particular. The largest specimen observed, measured, when freed from its capsule and straightened out, 0·1mm. in length. The diameter of the head was 0·4mm. when seen in ventral view. The neck was 0·3mm. in diameter. The body was contracted until it was nearly circular in outline and measured 0·6mm. in breadth. The head bears six papillary appendages. Two of these are lateral, somewhat triangular in shape and project from the anterior edges of the sucker. In the largest specimen observed these measured about 0·2mm. in length. The other four papillæ lie on the antero-dorsal side of the head. They are flattish, bluntly-rounded, 0·1mm. broad and 0·15mm. in length. The oral sucker is considerably larger than the ventral. The former is about 0·3mm. by 0·2mm. in its two diameters, the antero-posterior diameter being the longer. The latter is 0·2mm. in its transverse diameter and a little less than this in its antero-posterior diameter. In another specimen the anterior sucker was 0·36mm. long and 0·3mm. broad, and the ventral 0·2mm. long and 0·24mm. broad. The testes are about 0·2mm. in length. The anterior end of some of the smaller specimens appears to be invaginated.

The cysts are globular. Each specimen when freed from its connective-tissue shell, is found to be enclosed in a thin pellicle. The diameter of the pellicular cysts is, in most cases, about 0·5mm.

Prof. Wright states in the article alluded to above, that the structure of the mouth sucker of his specimen is not entirely in accordance with Von Linstow's description. While my specimens agree so closely with Prof. Wright's that I have no hesitation in regarding them as identical, I do not find it so easy to refer them to *D. nodulosum*, as described by Von Linstow, Archiv f. Naturg., 1873, XXXIX, where the larval stage from *Paludina impura* and the adult from *Perca fluviatilis* are figured. The same difficulty is experienced when they are compared with Olsson's account, Bidrag till Skand. Helm., pp. 23—24. Taf. IV. fig. 51, where a side view of the head of an adultis figured.

The cysts were found "about the heart, intestine and other organs in the hinder part of the thoracic region." They were collected in December 1891.

It cannot be concluded, from the specimens at hand, that the crayfish is a proper intermediate host of this parasite, although the considerable number of cysts and the different degrees of development of their contents make the inference not altogether improbable that they are genuine guests and not strangers which have strayed into an unusual host.—EDWIN LINTON, *Washington and Jefferson College, Washington, Pa., Dec.* 31, 1891.

Branchiostoma elongatum Sundevall at San Diego, California.—In 1868 Cooper described three specimens of a *Branchiostoma* which he obtained near La Playa in San Diego Bay in 10 fathoms of water. Since then *Branchiostoma* has not again been recorded from the Pacific Coast of America. Last Summer on visiting a dredge which was at work in San Diego Bay near Ballast Point about a hundred specimens were obtained. On subsequent visits to the dredge Mr. L. C. Bragg found them in greater or less abundance.

The specimens were all large, some of them reaching 3¼ in. in length. But very few of them were sexually mature July 1st. Surface skimming never brought the eggs or larvæ. There are about 70 (from 68 —75) myocommata arranged as follows: 45 to atrial pore; 16 from atrial pore to anus; 9 behind anus.

The species may be identical with *Branchiostoma elongatum* Sundevall from the coast of Peru, as Dr. Jordan has suggested. The formula differs however, the myocommas in the Peruvian specimens being 49+18+12.

To those engaged in teaching it may be of interest to know that specimens of this Amphioxus may be obtained of Mr. L. C. Bragg, Coronado Beech, California.—C. H. EIGENMANN, *Bloomington, Indiana.*

On the Presence of an Operculum in the Aspredinidæ.—In our "Revision of the South American Nematognathi" (p. 9) we defined the Bunocephalidæ=Aspredinidæ as having no opercle. In this we followed Cope, who separated the Aspredinidæ from the remaining Nematognathi by their lack of an opercle.

We have lately obtained a specimen of *Aspredo aspredo* Linnæus from the Museum of Comparative Zoology and have re-examined this point. The closer inspection has demonstrated the presence of a minute operculum attached to the upper posterior border of the expanded hyomandibular. It is movable in moist preparations but becomes immovably fixed with drying, which may have led to the original statement. The interopercle is about as large as the opercle and apparently immovably joined to the hyomandibular and preopercle. Brühls "Osteologisches aus dem Pariser Pflanzengarten" 1856, contains the only figures published of the skull of *Aspredo.* Since these figures are inexact in several respects I add a figure of the dorsal aspect of the skull, etc. of *Aspredo aspredo.*—C. H. EIGENMANN.

The Barn Owl in Minnesota.—Three barn owls, *Strix pratincola,* were recently taken from a hollow tree near Waterville, Minnesota and are still alive and in possession of Chas. A. Gray of that place. The fact is interesting since barn owls are scarcely ever found this far north.

Mr. Gray says, "The birds are as healthy and strong as when I got them. They dislike cats and dogs and make a hissing noise when these animals are near. When alone at night they make the same noise with a gurgling sound. When I talk to them they sway their bodies back and forth like some wild animals in cages. They live on rabbits and birds, are very tame and like to be petted as much as a dog."

As is often the case, these birds have excited considerable curiosity and photographs have been taken and sent to several places.

—U. O. Cox.

The Ruffed Grouse in Hudson, Ohio.—This is a small village with an area of two and a half square miles and a population of about 1200.

Three years ago in September a Ruffed Grouse (*Bonasa umbellus*) was observed in the central part of the village feeding upon grapes on a vine covering the top of an apple tree. By common consent, care was taken that it should not be disturbed or frightened. It remained during the fall and winter, most of the time in the same block. It has returned each fall and remained until spring, and is now with us. It forages about the dwellings; feeding on the vines of the barberry, ampelopsis etc.; picking the white clover on the lawns and towards spring feeding on the buds of the apple trees. There are a few houses around which it delights to forage, where its tracks in the snow are to be seen at daylight and where it is often seen by day. It moves about with the characteristic caution of the wild bird, but has lost much of its timidity, as one can approach within 10 or 12 feet of it without disturbing it. Our hopes that it would return some fall with a mate have not been realized. The familiarity of the returning bird with its old favorite haunts, establishes its identity.

—M. C. READ.

On some Peculiarities in the Structure of the Cervical Vertebræ in the existing Monotremata.—For a long time I have been acquainted with the peculiar fact that the cervical vertebræ of Ornithorhynchus and Echidna are devoid of præ and postzygapophyses. In these forms therefore the cervical vertebræ are only connected with each other by the centra of the vertebræ and not by the arches. I do not know whether this condition is mentioned by Gervais, in his Osteographie des Monotremes, 1877, this work being not at hand. But since it is not noticed by Flower and Lydeker in their work, An Introduction to the study of Mammals, Living and Extinct, London 1891, nor in Flower's Osteology of Mammals, I should like to call the attention to it. I have observed this peculiarity in all the living forms of the Monotremata: *Ornithorhynchus, Echidna, Proechidna,* and it is very interesting to see that the same condition is found in two families so completely separated. I do not remember a similar case among any of the higher vertebrates.—G. BAUR, *Clark University, Worcester, Mass., Jan.* 11, 1892.

The Armadillo (*Tatusia peba*) **in Texas.**—It may be of interest to some of your readers to know that the Armadillo, which has been supposed to occur in Texas only in the extreme south-west, is gradually ranging eastward.

During the past Summer a specimen was taken within a few miles of Austin and is now in our museum. Several have been seen on Onion Creek just south of here and they are quite numerous on the Navidad river in Lavaca County east of the ninety-seventh degree of longitude.—E. T. DUMBLE, *State Geologist.*

The Arachnoid of the Brain.—In the N. Y. Medical Record, Aug. 15, 1891, Dr. F. W. Langdon publishes some new observations on the Arachnoid of the Brain which are summarized as follows.

"1. The arachnoid membrane is a true shut sac, similar in structure and function to the serous membrane of the other great cavities. Its parietal layer is easily separable from the dura at the vertex in the fœtus and young infant, but practically inseparable in this region in the adults. At the base of the skull it is demonstrable as a separate membrane even in the adult. To assert that the parietal layer of the arachnoid is absent, because its subepithelial connective tissue has fused at the vertex with the dura (connective tissue) is as incorrect as to describe the great omentum as one layer of peritoneum, because its original four layers have become matted and adherent."

"2. The arachnoid cavity communicates freely with the subarachnoid space, by means of two foramina situated in the visceral arachnoid, one on either side of the medulla. For these I would propose the name 'lunulate foramina,' from their crescentic or lunulated edges, produced by the attachments of fibrous bands which cross the openings transversely. Subsequent observations, in two instances, confirm the presence of the 'lunulate foramina.' In one of these, the basilar process of the occipital and the sphenoid body were cut away from the base and the dura removed, so as to show the foramina *in situ*; thus excluding the possibility of their artificial production during the extraction of the brain."